

FIG. 1

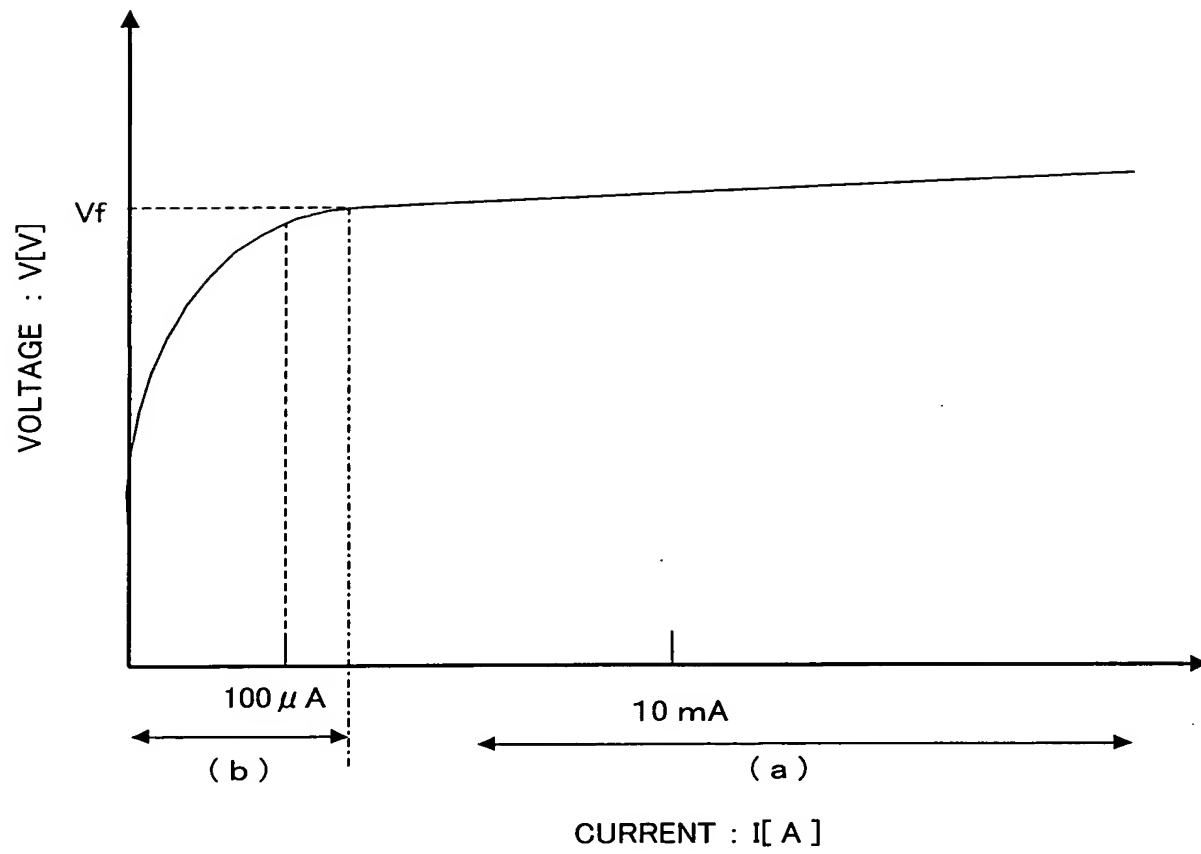
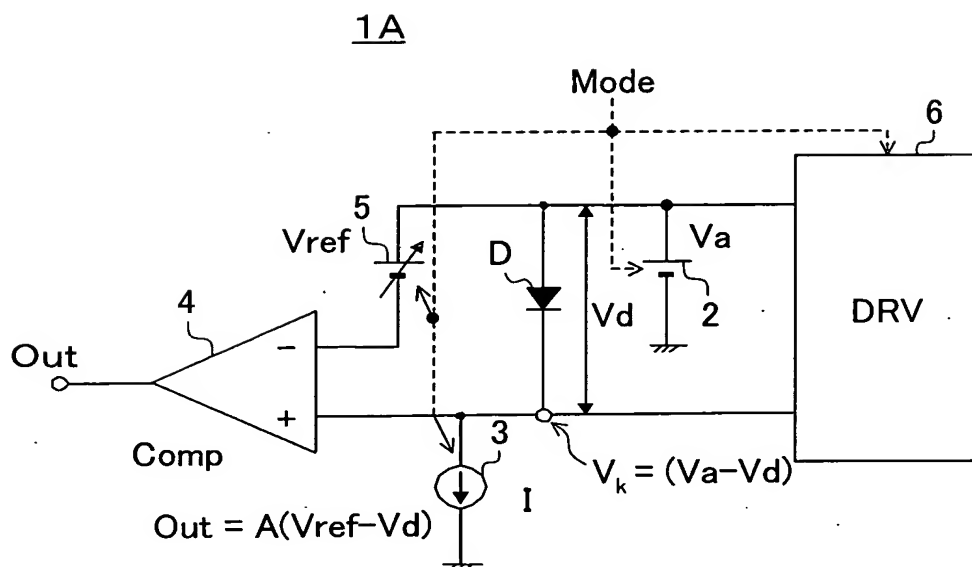


FIG. 2



1A: VOLTAGE DETECTION CIRCUIT

2: POWER SOURCE

3: CONSTANT CURRENT SOURCE

4: COMPARATOR

5: REFERENCE VOLTAGE (V_{ref}) SUPPLY MEANS

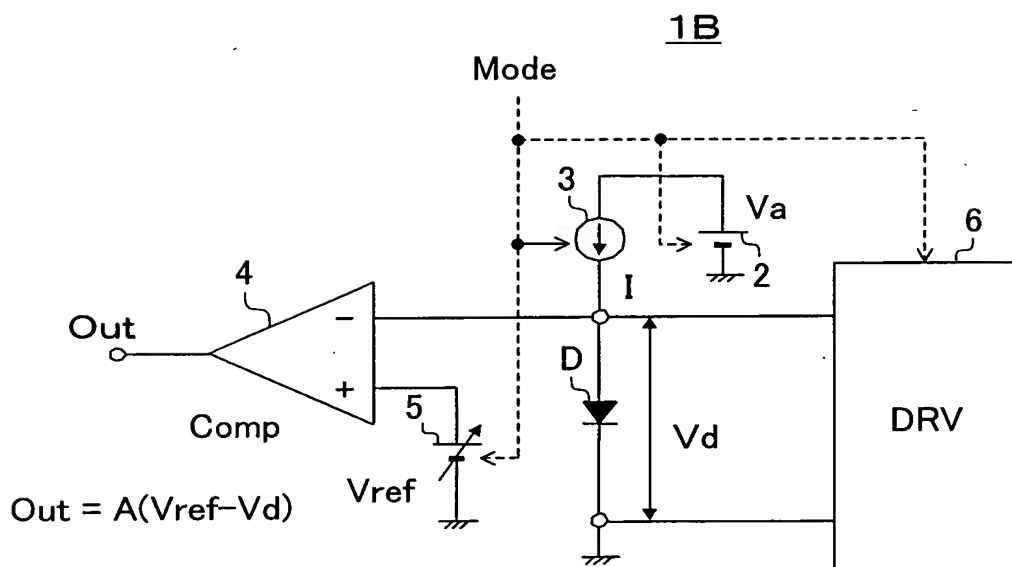
D: LIGHT-EMITTING DIODE (LED)

V_d : VOLTAGE BETWEEN TERMINALS

I: CONSTANT CURRENT

Mode: SIGNAL INDICATING DEFECT DETECTION MODE

FIG. 3



1B: VOLTAGE DETECTION CIRCUIT

2: POWER SOURCE

3: CONSTANT CURRENT SOURCE

4: COMPARATOR

5: REFERENCE VOLTAGE (V_{ref}) SUPPLY MEANS

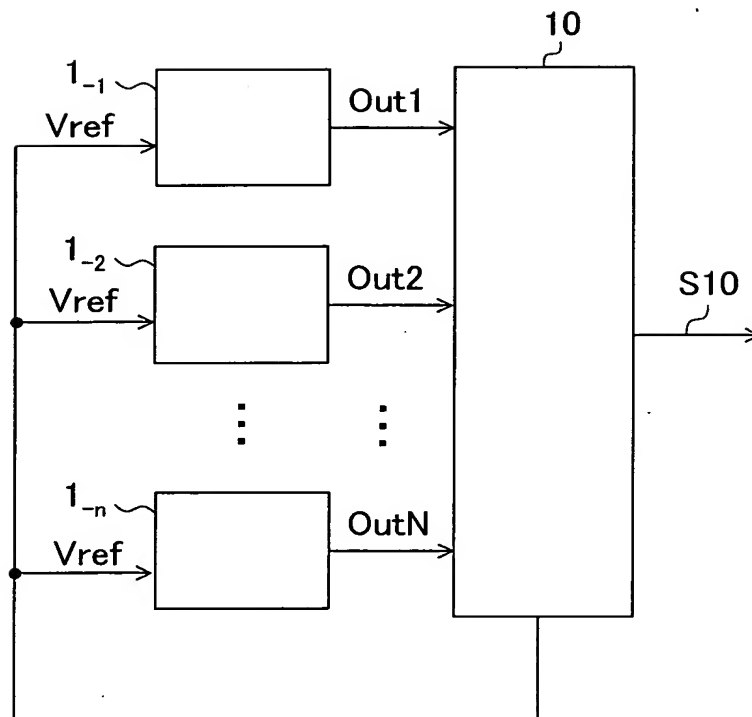
D: LIGHT-EMITTING DIODE (LED)

V_d : VOLTAGE BETWEEN TERMINALS

I: CONSTANT CURRENT

Mode: SIGNAL INDICATING DEFECT DETECTION MODE

FIG. 4



$1_{-1} \sim 1_{-N}$: VOLTAGE DETECTION CIRCUIT
10: DEFECT DETECTION CIRCUIT

FIG. 5

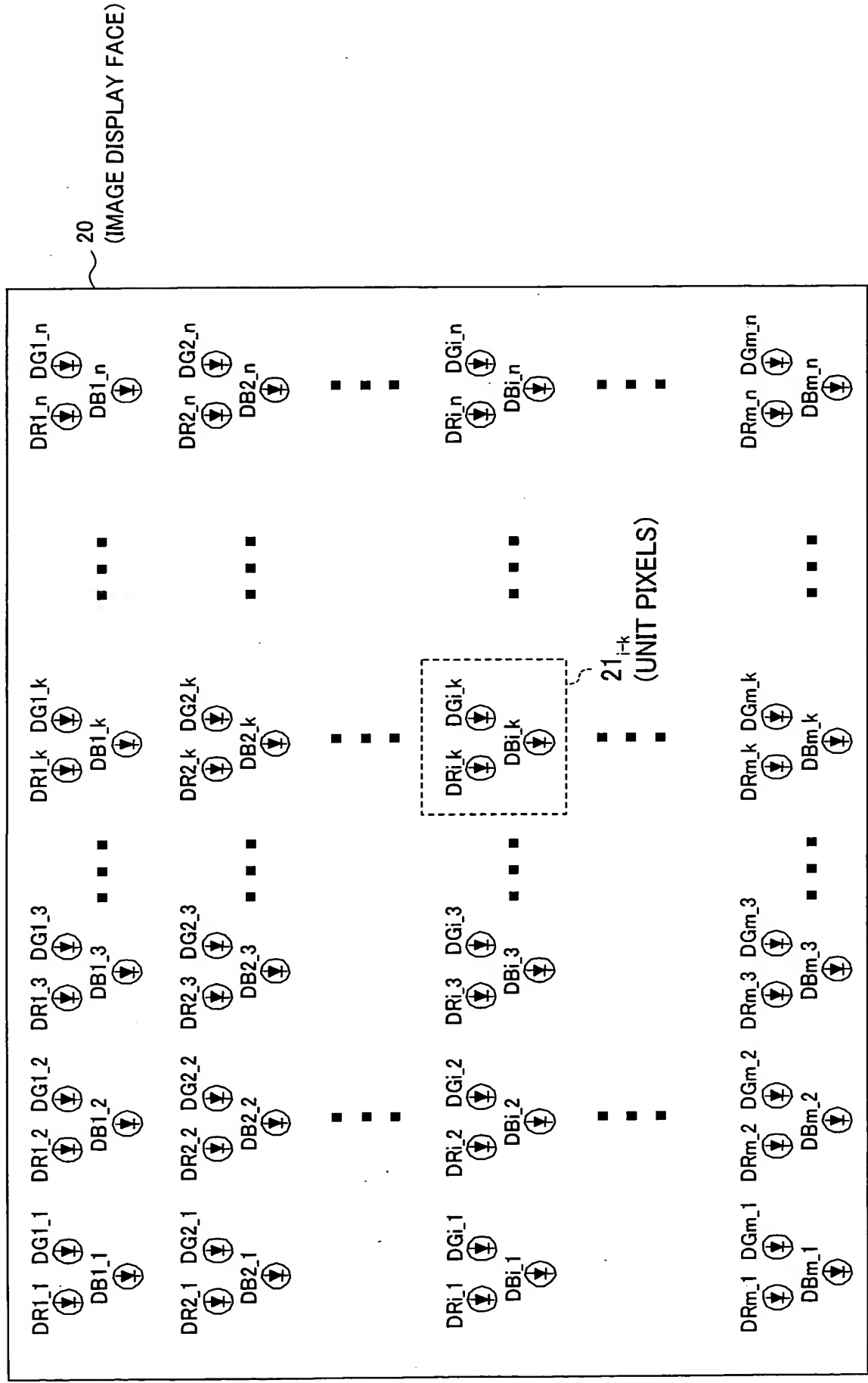


FIG. 6

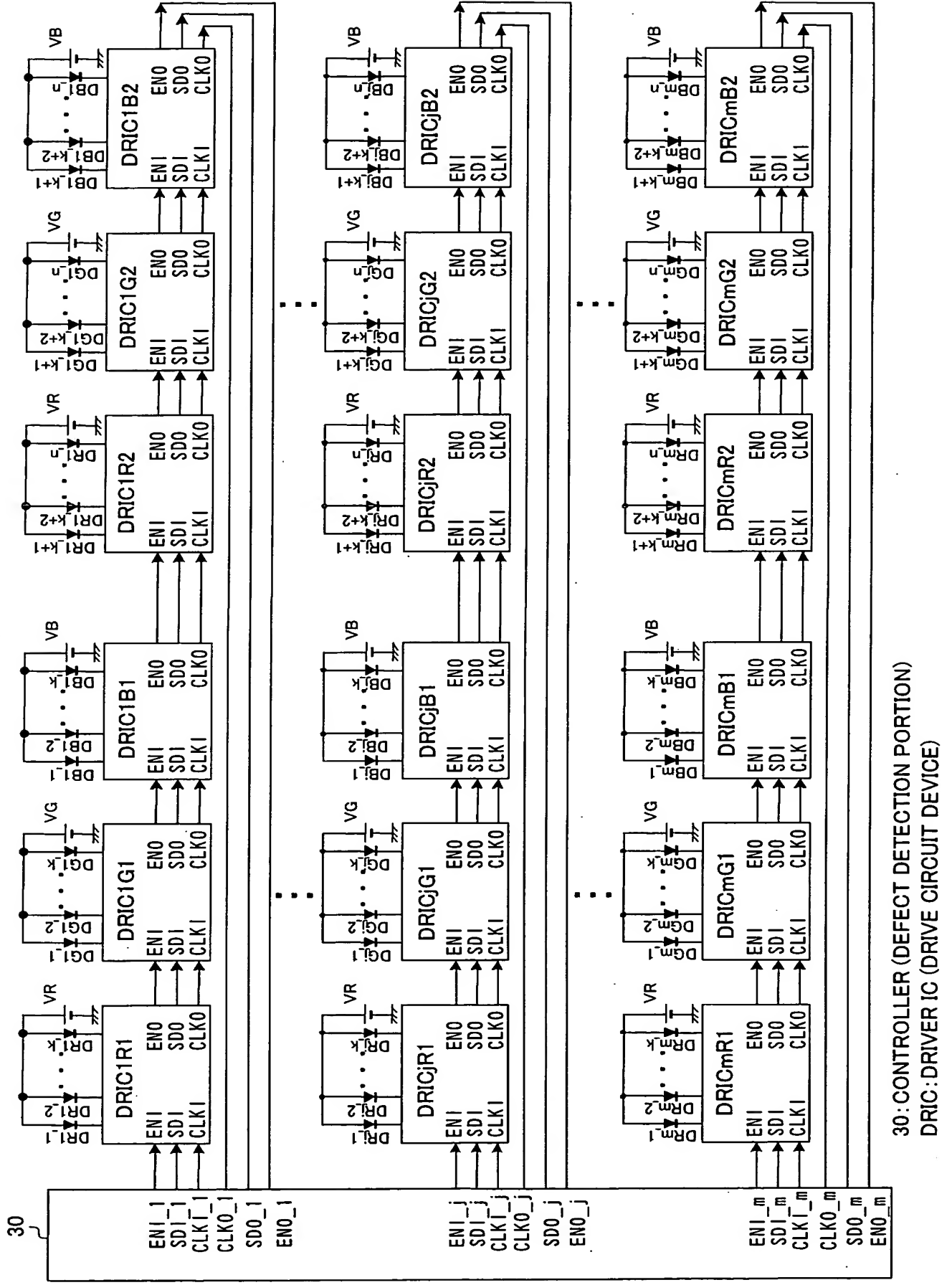
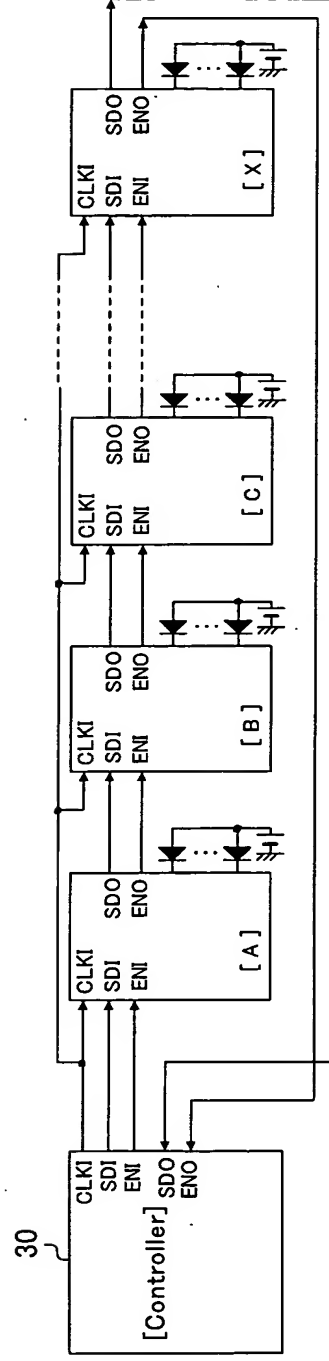


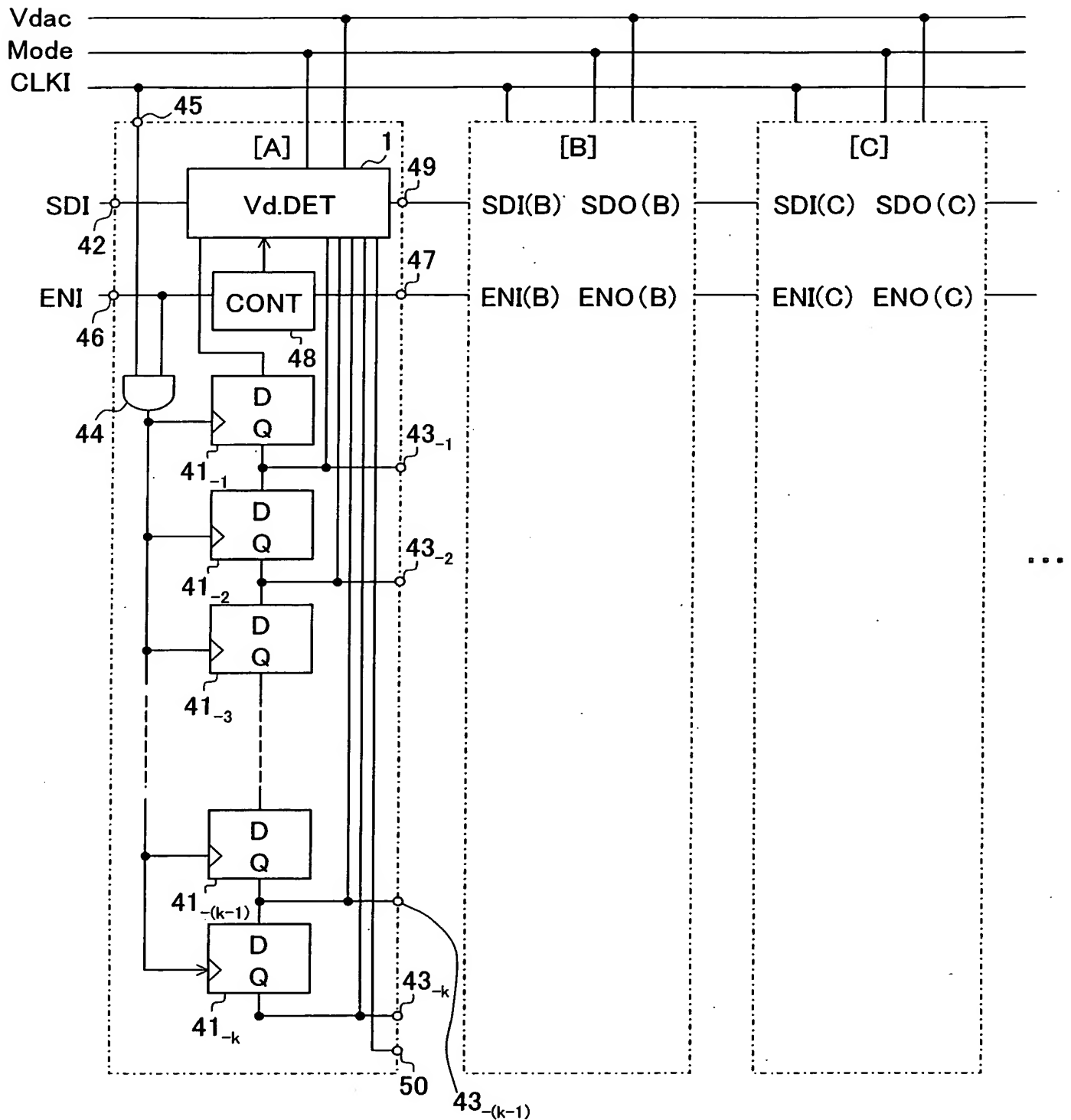
FIG. 7



30: CONTROLLER (DEFECT DETECTION PORTION)

[A] TO [X] : DRIVER IC (DRIVE CIRCUIT DEVICE)

FIG. 8



[A] TO [C]: DRIVER IC (DRIVE CIRCUIT DEVICE)

1: VOLTAGE DETECTION CIRCUIT

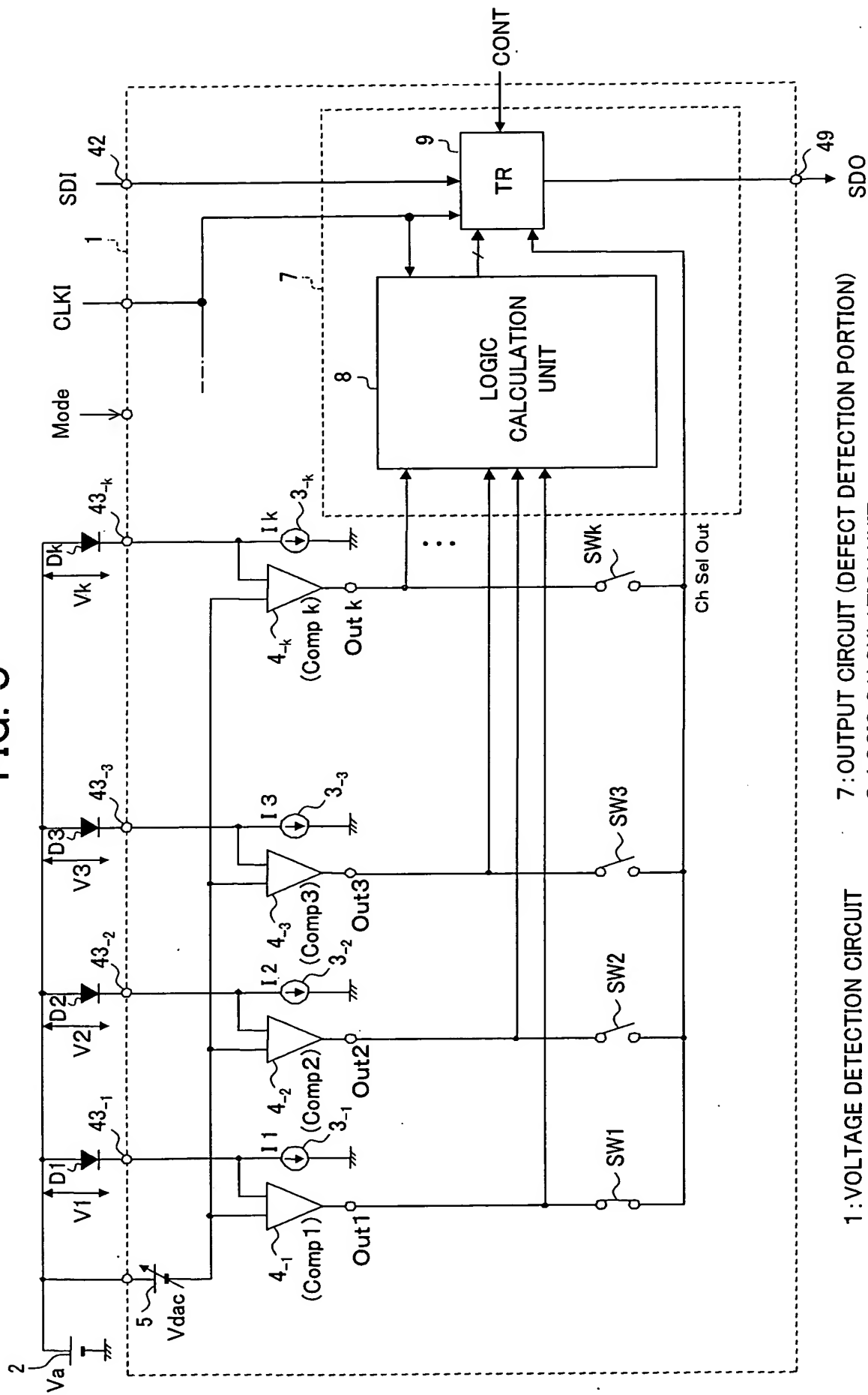
V_{dac} : REFERENCE VOLTAGE

Mode: SIGNAL INDICATING DEFECT DETECTION MODE

SDI : INPUT DATA SIGNAL

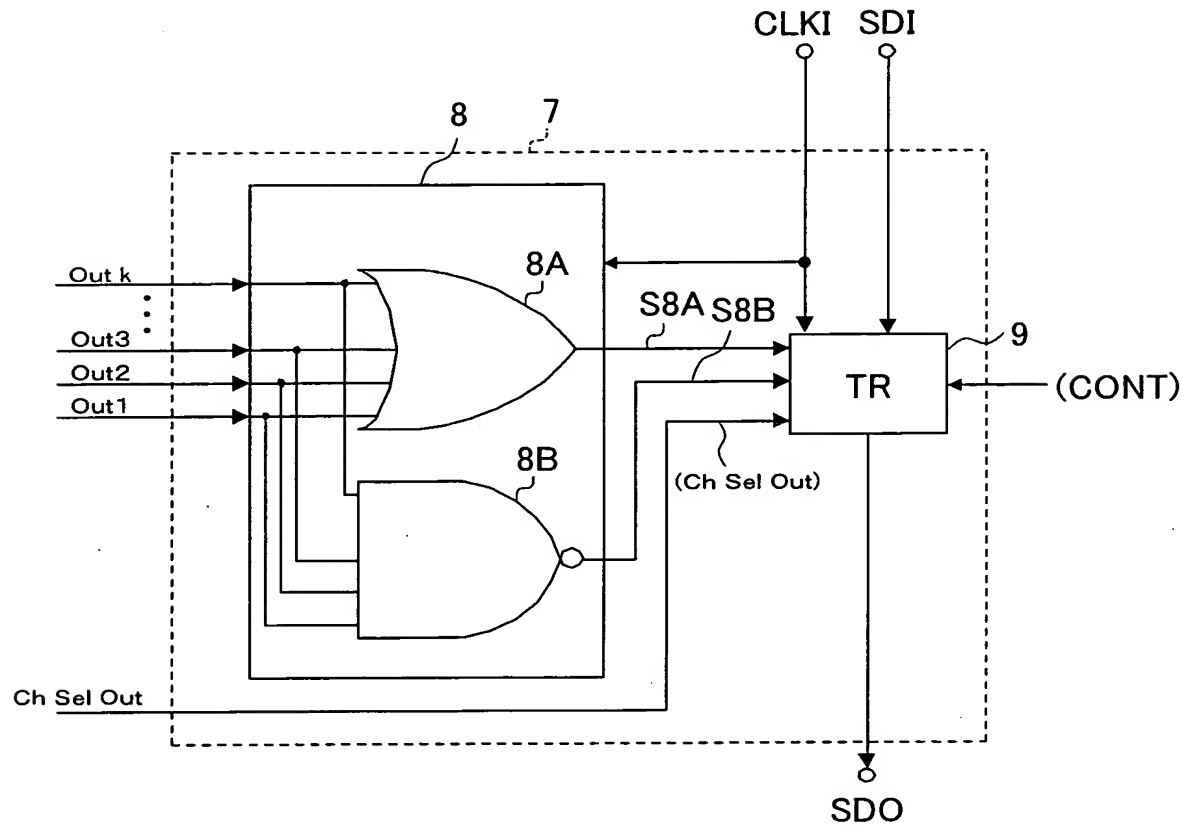
ENI : INPUT ENABLE SIGNAL

FIG. 9



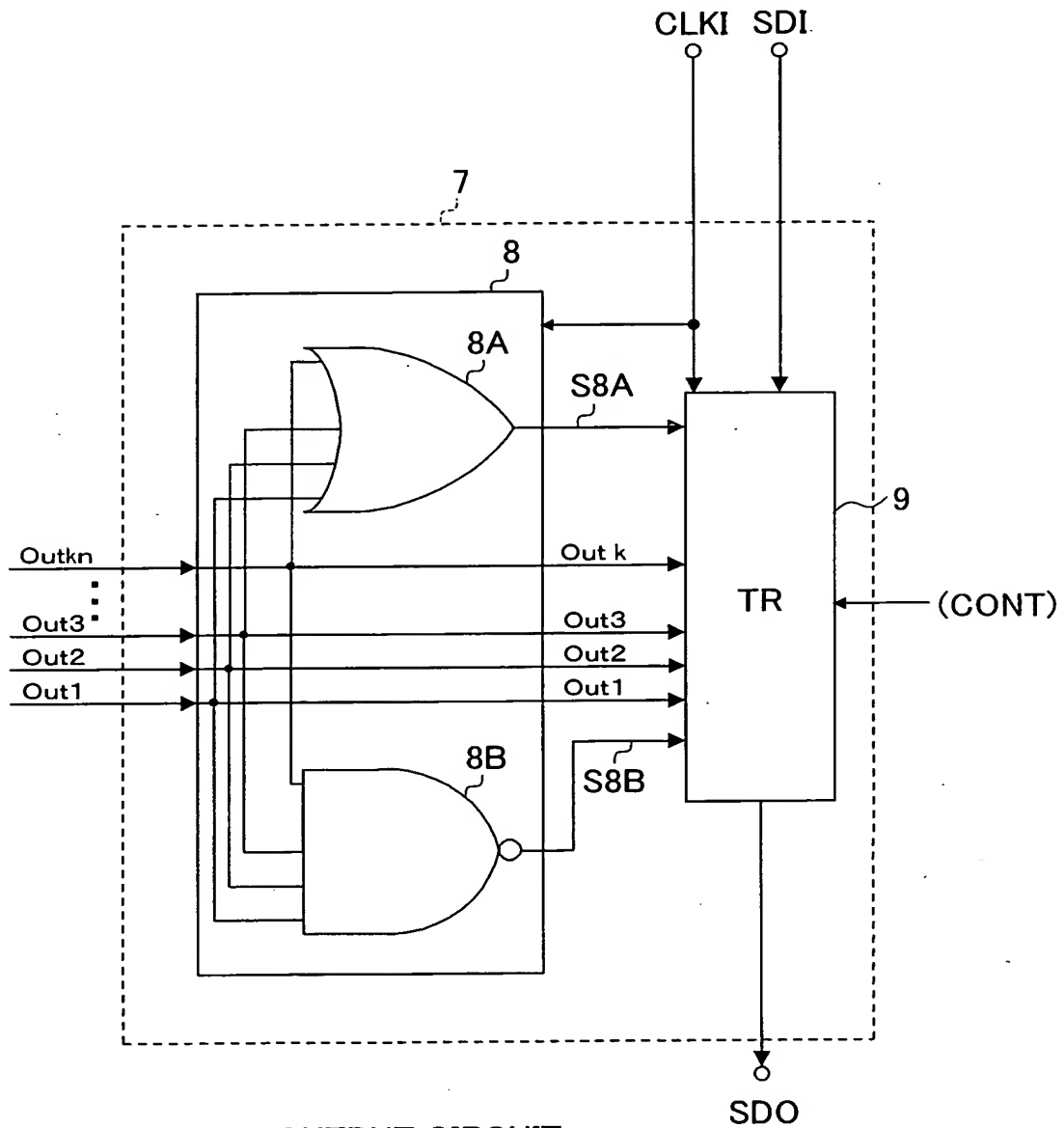
- 1: VOLTAGE DETECTION CIRCUIT
2: POWER SOURCE
3-1 ~ 3-k: CONSTANT CURRENT SOURCE
4-1 ~ 4-k: COMPARATOR
5: DAC
7: OUTPUT CIRCUIT (DEFECT DETECTION PORTION)
8: LOGIC CALCULATION UNIT
9: TRANSFER REGISTER PORTION

FIG. 10



7: OUTPUT CIRCUIT
 8: LOGIC CALCULATION UNIT
 9: TRANSFER REGISTER PORTION
 Out1 ~ Outk: COMPARATOR OUTPUT
 SDI: INPUT DATA SIGNAL
 SDO: OUTPUT DATA SIGNAL

FIG. 11



7: OUTPUT CIRCUIT
 8: LOGIC CALCULATION UNIT
 9: TRANSFER REGISTER PORTION
 Out1~Outk: COMPARATOR OUTPUT
 SDI: INPUT DATA SIGNAL
 SDO: OUTPUT DATA SIGNAL

